

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

- 1 1. (Currently amended) A method for reducing the overhead involved
2 in executing native code methods in an application running on a virtual machine,
3 comprising:
4 selecting a call to ~~a~~any native code method to be optimized within the
5 virtual machine;
6 decompiling at least part of the selected native code method into an
7 intermediate representation;
8 obtaining an intermediate representation associated with the application
9 running on the virtual machine which interacts with the native code method;
10 ~~combining~~integrating the intermediate representation for the native code
11 method ~~with~~into the intermediate representation associated with the application
12 running on the virtual machine to form ~~a combined~~an integrated intermediate
13 representation, ~~wherein combining the intermediate representations involves~~
14 ~~inlining native code methods into call sites in the application~~; and
15 generating native code from the ~~combined~~integrated intermediate
16 representation, wherein the native code generation process optimizes interactions
17 between the application running on the virtual machine and the native code
18 method, wherein optimizing the interactions involves using contextual
19 information from within the integrated intermediate representation that is
20 generated from the native code method as well as the application in order to

21 optimize calls to the native code method by the application within the integrated
22 intermediate representation.

1 2. (Original) The method of claim 1, wherein selecting the call to the
2 native code method involves selecting the call based upon at least one of:
3 the execution frequency of the call; and
4 the overhead involved in performing the call to the native code method as
5 compared against the amount of work performed by the native code method.

1 3 (Canceled).

1 4. (Original) The method of claim 1, wherein optimizing interactions
2 between the application running on the virtual machine and the native code
3 method involves optimizing callbacks by the native code method into the virtual
4 machine.

1 5. (Original) The method of claim 4, wherein optimizing callbacks by
2 the native code method into the virtual machine involves optimizing callbacks
3 that access heap objects within the virtual machine.

 6. (Previously presented) The method of claim 4,
 wherein the virtual machine is a platform-independent virtual machine;
and

 wherein combining the intermediate representation for the native code
method with the intermediate representation associated with the application
running on the virtual machine involves integrating calls provided by an interface
for accessing native code into the native code method.

1 7. (Original) The method of claim 1, wherein obtaining the
2 intermediate representation associated with the application running on the virtual
3 machine involves recompiling a corresponding portion of the application.

1 8. (Original) The method of claim 1, wherein obtaining the
2 intermediate representation associated the application running on the virtual
3 machine involves accessing a previously generated intermediate representation
4 associated with the application running on the virtual machine.

1 9. (Original) The method of claim 1, wherein prior to decompiling
2 the native code method, the method further comprises setting up a context for the
3 decompilation by:
4 determining a signature of the call to the native code method; and
5 determining a mapping from arguments of the call to corresponding
6 locations in a native application binary interface (ABI).

1 10. (Currently amended) A computer-readable storage device storing
2 instructions that when executed by a computer cause the computer to perform a
3 method for reducing the overhead involved in executing native code methods in
4 an application running on a virtual machine, the method comprising:
5 selecting a call to ~~a~~any native code method to be optimized within the
6 virtual machine;
7 decompiling at least part of the selected native code method into an
8 intermediate representation;
9 obtaining an intermediate representation associated with the application
10 running on the virtual machine which interacts with the native code method;
11 ~~combining~~integrating the intermediate representation for the native code
12 method ~~with~~into the intermediate representation associated with the application

13 running on the virtual machine to form a ~~combined~~ an integrated intermediate
14 representation, ~~wherein combining the intermediate representations involves~~
15 ~~inlining native code methods into call sites in the application; and~~
16 generating native code from the ~~combined~~ integrated intermediate
17 representation, wherein the native code generation process optimizes interactions
18 between the application running on the virtual machine and the native code
19 method, wherein optimizing the interactions involves using contextual
20 information from within the integrated intermediate representation that is
21 generated from the native code method as well as the application in order to
22 optimize calls to the native code method by the application within the integrated
23 intermediate representation.

1 11. (Previously presented) The computer-readable storage device of
2 claim 10, wherein selecting the call to the native code method involves selecting
3 the call based upon at least one of:
4 the execution frequency of the call; and
5 the overhead involved in performing the call to the native code method as
6 compared against the amount of work performed by the native code method.

1 12 (Canceled).

1 13. (Previously presented) The computer-readable storage device of
2 claim 10, wherein optimizing interactions between the application running on the
3 virtual machine and the native code method involves optimizing callbacks by the
4 native code method into the virtual machine.

1 14. (Previously presented) The computer-readable storage device of
2 claim 13, wherein optimizing callbacks by the native code method into the virtual

3 machine involves optimizing callbacks that access heap objects within the virtual
4 machine.

1 15. (Previously presented) The computer-readable storage device of
2 claim 13,
3 wherein the virtual machine is a platform-independent virtual machine;
4 and
5 wherein combining the intermediate representation for the native code
6 method with the intermediate representation associated with the application
7 running on the virtual machine involves integrating calls provided by an interface
8 for accessing native code into the native code method.

1 16. (Previously presented) The computer-readable storage device of
2 claim 10, wherein obtaining the intermediate representation associated with the
3 application running on the virtual machine involves recompiling a corresponding
4 portion of the application.

1 17. (Previously presented) The computer-readable storage device of
2 claim 10, wherein obtaining the intermediate representation associated with the
3 application running on the virtual machine involves accessing a previously
4 generated intermediate representation associated with the application running on
5 the virtual machine.

1 18. (Previously presented) The computer-readable storage device of
2 claim 10, wherein prior to decompiling the native code method, the method
3 further comprises setting up a context for the decompilation by:
4 determining a signature of the call to the native code method; and

5 determining a mapping from arguments of the call to corresponding
6 locations in a native application binary interface (ABI).

1 19-27. (Cancelled)

1 28. (Currently amended) A method for reducing the overhead involved
2 in executing native code methods in an application running on a virtual machine,
3 comprising:
4 deciding to optimize a callback by ~~a~~any native code method into the
5 virtual machine;
6 decompiling at least part of the selected native code method into an
7 intermediate representation;
8 obtaining an intermediate representation associated with the application
9 running on the virtual machine which interacts with the native code method;
10 ~~combining~~integrating the intermediate representation for the native code
11 method ~~with~~into the intermediate representation associated with the application
12 running on the virtual machine to form ~~a combined~~an integrated intermediate
13 representation, ~~wherein combining the intermediate representations involves~~
14 ~~inlining native code methods into call sites in the application; and~~
15 generating native code from the ~~combined~~integrated intermediate
16 representation, wherein the native code generation process optimizes the callback
17 by the native code method into the virtual machine, wherein optimizing the
18 interactions involves using contextual information from within the integrated
19 intermediate representation that is generated from the native code method as well
20 as the application in order to optimize calls to the native code method by the
21 application within the integrated intermediate representation.

1 29. (Original) The method of claim 28, wherein the native code
2 generation process also optimizes calls to the native code method by the
3 application.

1 30. (Original) The method of claim 28, wherein optimizing the
2 callback by the native code method into the virtual machine involves optimizing a
3 callback that accesses a heap object within the virtual machine.

1 31. (Previously presented) The method of claim 28,
2 wherein the virtual machine is a platform-independent virtual machine;
3 and
4 wherein combining the intermediate representation for the native code
5 method with the intermediate representation associated with the application
6 running on the virtual machine involves integrating calls provided by an interface
7 for accessing native code into the native code method.

1 32. (Currently amended) A computer-readable storage device storing
2 instructions that when executed by a computer cause the computer to perform a
3 method for reducing the overhead involved in executing native code methods in
4 an application running on a virtual machine, the method comprising:
5 deciding to optimize a callback by a any native code method into the
6 virtual machine;
7 decompiling at least part of the selected native code method into an
8 intermediate representation;
9 obtaining an intermediate representation associated with the application
10 running on the virtual machine which interacts with the native code method;
11 ~~combining~~ integrating the intermediate representation for the native code
12 method ~~with~~ into the intermediate representation associated with the application

13 running on the virtual machine to form ~~a combined~~ an integrated intermediate
14 representation, ~~wherein combining the intermediate representations involves~~
15 ~~inlining native code methods into call sites in the application; and~~
16 generating native code from the combined intermediate representation,
17 wherein the native code generation process optimizes the callback by the native
18 code method into the virtual machine, wherein optimizing the interactions
19 involves using contextual information from within the integrated intermediate
20 representation that is generated from the native code method as well as the
21 application in order to optimize calls to the native code method by the application
22 within the integrated intermediate representation.

1 33. (Previously presented) The computer-readable storage device of
2 claim 32, wherein the native code generation process also optimizes calls to the
3 native code method by the application.

1 34. (Previously presented) The computer-readable storage device of
2 claim 32, wherein optimizing the callback by the native code method into the
3 virtual machine involves optimizing a callback that accesses a heap object within
4 the virtual machine.

1 35. (Previously presented) The computer-readable storage device of
2 claim 32,
3 wherein the virtual machine is a platform-independent virtual machine;
4 and
5 wherein combining the intermediate representation for the native code
6 method with the intermediate representation associated with the application
7 running on the virtual machine involves integrating calls provided by an interface
8 for accessing native code into the native code method.

1 36-39. (Canceled)